CLAIMS

1. A gas sensor (10), comprising:

a sensing element (80), having a lower portion (82) disposed within a subassembly (14) and an upper portion (84) disposed within a wiring harness assembly (12) comprising an upper shield (20) disposed around a wiring harness;

a terminal support (60) disposed within said wiring harness;

a first portion of a terminal (62), (63) disposed within said terminal support (60) and in electrical communication with said sensing element (80); and

a first insulator (90) at least partially disposed within said upper shield (20) and around said sensing element upper portion (84), said first insulator (90) having a passage (93) for receiving a second portion of said terminal (62), (63), wherein at least a portion of said first insulator (90) is disposed between said terminal (62), (63), said second portion and said upper shield (20).

2. The gas sensor (10)of Claim 1, wherein said first insulator (90) is a material selected from the group consisting of a ceramic, metal, and combinations, alloys, and composites comprising at least one of the foregoing materials.

3. The gas sensor (10) of Claim 2, wherein said ceramic selected from the group consisting of including steatite, alumina, and combinations comprising at least one of the foregoing ceramics.

4. The gas sensor (10) of Claim 2, wherein said first insulator (90) is in a form selected from the group consisting of random fibers, chopped fibers, continuous fibers, woven fibers, woven mesh, non-woven mesh, and combinations comprising at least one of the foregoing forms.

5. The gas sensor (10) of Claim 1, wherein said terminal support (60) is a material selected from the group consisting of thermoplastic, thermoset, ceramic, and combinations comprising at least one of the foregoing materials.

6. The gas sensor (10) of Claim 5, wherein said ceramic is selected from the group consisting of steatite, alumina, among others and combinations comprising at least one of the foregoing ceramic materials.

7. A method of producing a gas sensor (10), comprising:

disposing an upper portion (84) of a sensing element (80) within a wiring harness assembly (12) comprising an upper shield (20) disposed around a wiring harness; disposing a lower portion (82) of said sensing element within a subassembly (14);

disposing a terminal support (60) within said wiring harness;

disposing a first portion of a terminal (62), (63) within said terminal support (60) and disposing in electrical communication with said sensing element (80); and

disposing a first insulator (90) at least partially within said upper shield (20) and around said sensing element upper portion (84), said first insulator (90) having a passage for receiving a second portion of said terminal (62), (63), wherein at least a portion of said first insulator (90) is disposed between said terminal (62), (63), said second portion and said upper shield (20); and

exposing said sensor (10) to engine operating conditions.

8. The method of Claim 7, wherein said first insulator (90) is a material selected from the group consisting of a ceramic, metal, and combinations, alloys, and composites comprising at least one of the foregoing materials.

9. The method of Claim 8, wherein said ceramic selected from the group consisting of including steatite, alumina, and combinations comprising at least one of the foregoing ceramics.

10. The method of Claim 8, wherein said first insulator (90) is in a form selected from the group consisting of random fibers, chopped fibers, continuous fibers, woven fibers, woven mesh, non-woven mesh, and combinations comprising at least one of the foregoing forms.

11. The method of Claim 7, wherein said terminal support (60) is a material selected from the group consisting of thermoplastic, thermoset, ceramic, and combinations comprising at least one of the foregoing materials.

12. The method of Claim 11, wherein said ceramic is selected from the group consisting of steatite, alumina, among others and combinations comprising at least one of the foregoing ceramic materials.

13. A gas sensor (10), comprising:

a sensing element (80), having a lower portion disposed within a subassembly (14) and an upper portion disposed within a wiring harness assembly (12) comprising an upper shield (22) disposed around a wiring harness;

a one-piece seal (40), said seal (40) having a body disposed in a first portion of said upper shield (20), and a flange wherein an edge of said upper shield is disposed between at least a portion of said flange and said body;

a shell (50) disposed around said lower portion of said sensing element (80);

a first insulator (90), wherein at least a portion of said first insulator (90) is disposed between said sensing element (80) and said shell (50);

a lower shield (30) disposed around an end of said sensing element (80), said lower shield (30) in physical contact with said shell (50), and having a plurality of apertures (38);

at least one terminal (62), (63) in electrical communication with said sensing element (80); and

a terminal support (60) in physical contact with said terminal (62), (63).

14. The gas sensor (10) of Claim 13, wherein said subassembly (14) further comprises a talc pack (70) disposed within said shell (50) between said first insulator (90) and said lower shield (30).

15. The gas sensor (10) of Claim 14, wherein said subassembly (14) further comprises a second insulator (92) disposed within said shell (50) between said talc pack (70) and said lower shield (30).

16. The gas sensor (10) of Claim 13, wherein said first insulator (90) is a material selected from the group consisting of a ceramic, metal, and combinations, alloys, and composites comprising at least one of the foregoing materials.

17. The gas sensor (10) of Claim 16, wherein said ceramic selected from the group consisting of including steatite, alumina, and combinations comprising at least one of the foregoing ceramics.

18. The gas sensor (10) of Claim 16, wherein said first insulator (90) is in a form selected from the group consisting of random fibers, chopped fibers, continuous fibers, woven fibers, woven mesh, non-woven mesh, and combinations comprising at least one of the foregoing forms.

19. The gas sensor (10) of Claim 13, wherein said terminal support (60) is a material selected from the group consisting of thermoplastic, thermoset, ceramic, and combinations comprising at least one of the foregoing materials.

20. The gas sensor (10) of Claim 19, wherein said ceramic is selected from the group consisting of steatite, alumina, among others and combinations comprising at least one of the foregoing ceramic materials.